Anticoagulation and coronary bypass grafts

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Early studies have suggested that anticoagulation reduces mortality and myocardial infarction rates after coronary artery bypass surgery. As a result, anticoagulants were routinely used in the past for the purpose of maintaining the patency of aortocoronary bypass grafts. More recent studies, however, have shown that any benefit from such treatment was small and largely outweighed by the risks of universal anticoagulation in these patients. Routine long-term anticoagulation of patients with coronary grafts has therefore fallen out of favour, to be replaced by antiplatelet drugs as soon as the immediate postoperative period has passed. There is, however, still a role for anticoagulation in the peri-operative period and, in selected patients, in the long term.

1. Therapeutic principles

In general, there are two purposes of anticoagulation in patients with coronary grafts: the
first is to prevent graft thrombosis and the second is favourably to influence the progression of coronary disease. The most commonly used conduits for coronary grafting are autologous veins (such as the long saphenous) and arteries (such as the internal mammarys). We shall consider these separately.

1.1 Vein conduits

Early thrombosis occurs in 10-20% of all coronary grafts and its aetiology is multifactorial. Contributing causes include technical anastomotic errors, technical errors in graft lay-out (such as inappropriate length or a tendency to kink) and damage to the endothelium of the conduit by over-distension or surgical manipulation. With accumulating experience in coronary surgery, the occurrence of such causative factors is probably minimised and the majority of graft thromboses nowadays may be stagnation due to low flow within the graft leading because of poor "run-off" in the native coronary bed. The quality of "run-off" in coronary vascular beds cannot be readily measured on preoperative arteriography. In addition to these physical, flow-related causes of graft thrombosis, there are metabolic and haematological contributory factors such as platelet and coagulation disorders, postoperative inflammatory states and the intravascular presence of suture lines and disrupted endothelial surfaces which may form the initial focus for thrombus formation.

Anticoagulant therapy cannot influence any physical, flow-related causes of thrombosis such as a badly constructed graft, but can reduce the likelihood of thrombosis due to haematological and endothelial disturbances. For this purpose, heparin therapy is ideal in that it possesses both anticoagulant and anti-inflammatory activity, has a rapid action with a relatively short half-life and can be easily monitored, maintained within the desired therapeutic range and readily reversed when necessary. Heparin treatment should be started in the first few hours